

Shopping list and Questionnaire

from

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CERN, Geneva, September 1999

Measure magnetic axis and multipoles and field direction versus longitudinal position Y with a resolution of $\Delta Y = ?$, relative to:

- straight reference line along the aperture
(a light beam is not necessary straight !)
- center of the cold bore
- adjacent corrector magnets
- BPM's
- second magnet aperture and therein to what ? Magnet axis, center of cold bore,
- outside fiducials on cold mass (only when warm). Is it rigid enough against mechanical, transport, thermal effects ?
Fiducials only at location of cold feet, is it good enough ?

Is it sufficient to measure axis, averaged over Y (stretched wire) relative to:

- adjacent corrector magnets
- PBM'S
- outside fiducials

Can we allow for bent axis and twisted field direction ? Do we have to measure this versus Y ?

Fiducialisation of

- magnetic axis
- corrector magnets
- BPM'S

relative to

- Fiducials on cold mass
- Fiducials on cryostat

Can we trust the fiducials on the cryostat ?

- vacuum forces
- thermal deformation
- mechanical forces (supports, adjacent magnets,)
- ageing
- floor movements

Can we trust the cold feet (thermal transients, ageing,) ?

Installation in the ring

- Can we trust the position of the cold mass relative to the outside fiducials ?
Check when still open, when closed and under vacuum and cold ? After a quench ?
After a thermal cycle ?

Instrumentation to measure position of cold mass relative to outside fiducials

- When cold on the test bench
- When cold in the ring
- On-line detection of cold mass position
- On-line detection of fiducial position

Can we trust warm / cold correlation ? (Measure cold and warm at the manufacturer, repeat, and only warm at CERN ? Effect of ageing, transport,).